ANSWERS™

The Magazine for Tandy® Computer Customers

Celebrating
10 Years
of
Leadership
in
Personal
Computing

FIRST PC
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Radio Shack

TRS-80

VIDEO DISPLAY

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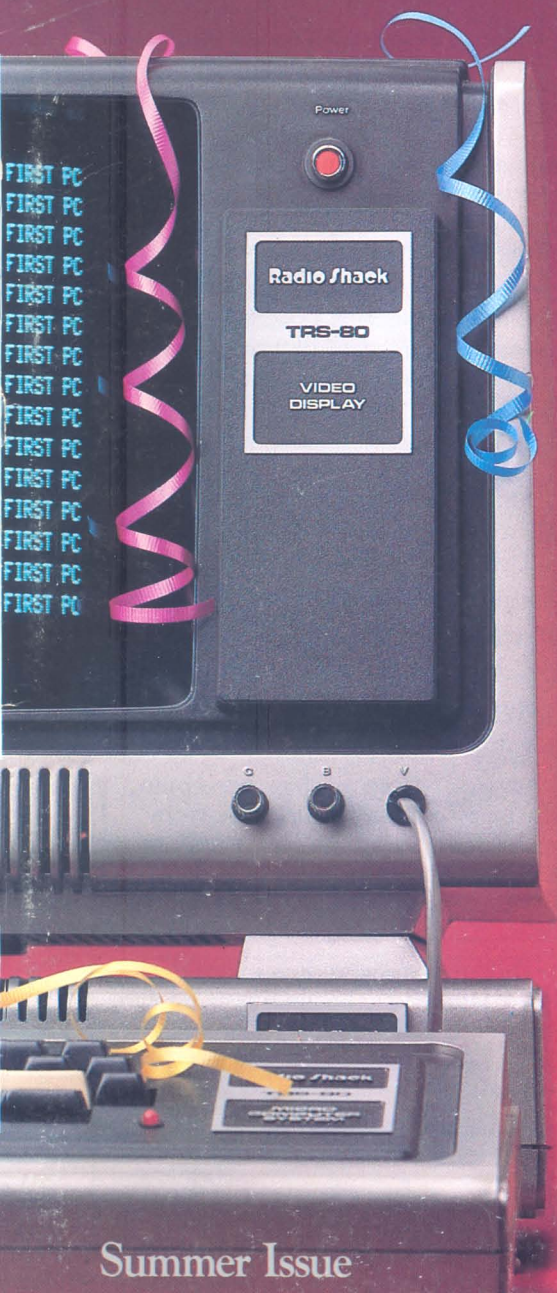
Summer Issue

Tried, true and triumphant

Ten years ago this August, a handful of Radio Shack people, including myself, were in the Warwick Hotel in New York City excited and ready to tell the world about our new Radio Shack TRS-80 personal computer. Based on the Z-80 microprocessor, it had 4K of memory, included a CPU, keyboard, display and cassette recorder and sold for $599.95. We were proud to present such an innovative, quality product.

Earlier this month, at the Waldorf Astoria Hotel in New York, an entourage of Radio Shack personnel, including myself, commanded the attention of the industry as we announced five new additions to our Tandy computer product line. Again, we were proud to be presenting such innovative, quality products.

The truth is, we've always been a leader in the industry and we absolutely plan to keep it that way. Our new products complement our already powerful product line, enabling us to offer the right computer for everyone from businesses that need compatibility and connectivity to first-time home users.

We've been in the personal computer business as long as anyone, but we've been in the technology business a lot longer than most—over 66 years. We've learned what it takes to have satisfied customers who return to our stores and computer centers again and again.

Quality, technology, compatibility, connectivity and longevity are our watchwords for success. That's why we can say with pride that there is no better value than our product line.

John V. Roach

—John V. Roach
Chairman, CEO and President
Tandy Corporation

LETTERS
TO THE EDITOR

Editor:

Currently, my office, an agent for Chicago Title Insurance Company, operates two portable Tandy 200 computers. We use them to do title searches in various courthouses, where an abstractor types in all the information that was previously written manually. Back in the office, we print it on a form, without retyping a report. At the same time, we are able to communicate through a local area network to a mini mainframe where I download all the title search information for later use and later reference and recall.

In the six courthouses where we search titles, the first time we appeared with the computer, we attracted quite a bit of attention. People want to see what we are doing and what the end result will be. We have found that the time it takes us to do a completed title search has been cut down.

William G. Schwab
President
Carbon County Abstract Co.
Lehighton, PA

NOTES
FROM THE EDITOR

Cause for celebration

We hope you enjoy this special "ten years in computing" anniversary issue of ANSWERS. We have loaded it with information about our company from our humble foray into the microcomputer industry to our current position as purveyor of the Number 1 selling PC-compatible.

As Tandy computers are prevalent in school systems as well as businesses, we've included a brief history of our Radio Shack Education Division and articles about two of the many educational institutions that have found our computers to be beneficial in both classroom and administrative applications.

In the business profile articles in this issue, there is frequent reference to earlier models of our computers. While many of these systems have been upgraded, several are still serving the needs of a variety of businesses. That says a lot for the quality and longevity we continue to build into our computer products.

With our new computer products, the pride continues. That's just cause for celebration!
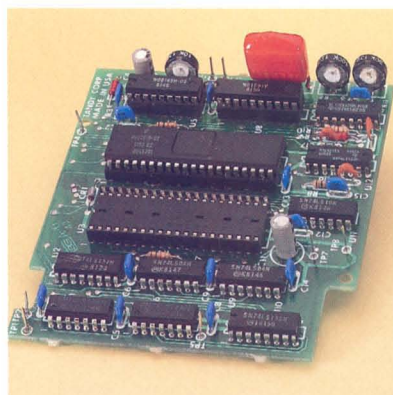
A bit of trivia

While collecting information for our anniversary issue, we happened onto the board in this photo. As we were reminiscing about "the old days," we thought it might be fun to test your recollection of our computer product line.

We'll tell you what it is in our next issue! Hint: It has something to do with one of our early models.

Are you using your Tandy/Radio Shack computer in an interesting manner? We'd like to hear about it. Just send us a brief description of your application, including the software and model number of the computer you're using. If we select your application for possible inclusion in *Answers* Magazine, we'll contact you—so be sure to include your address and phone number. Letters sent become the property of the magazine. Sorry, we can't return any letters received (so don't include diskettes, photos, etc.). Address letters to: *Answers* Magazine, 300 One Tandy Center, Fort Worth, Texas 76102.

CUSTOMER PROFILES

FOCUS ON TANDY

FOCUS ON EDUCATION

SPECIAL REPORT

The Shape of Things to Come:

Microsoft Chairman, Bill Gates

Computing in the Second Decade.

The fifth annual Tangent business users meeting, held April 27-29, 1987 in Fort Worth, Texas, brought Tandy computer users, Tandy Corporation/Radio Shack management and computer industry leaders together. While many subjects were addressed during the three day conference, several recurring themes clearly indicated there are definite roads the computer industry is taking in terms of advancements and the setting of standards. The information and quotes used in this article are drawn from the text of speeches made during the conference.

With the complexity of the computer market today, it is little wonder that Bill Gates, Chairman of Microsoft Corporation called 1987 "The year of great confusion in personal computing." Amid the confusion, however, Gates conceded, "A lot of the answers are coming into place. UNIX and networking are finally shaping up and now there's the OS/2 operating system." He also hailed OS/2 as "a very major step forward" that will remove the limitations of MS-DOS by allowing the running of multiple applications and access to more memory.

More speed, better software

The one topic repeatedly discussed at the conference was the hardware element Gates said would produce "far better machines" for the future: the Intel 80386 microprocessor. According to Gates, over the next two to three years, the software industry will develop the pieces necessary to fully utilize the power of the 80386. In the interim, users can take advantage of the increased speed of the 80386 while using MS-DOS software and the forthcoming software for OS/2. "Once the system software and applications for the 80386 are developed," Gates said, "the industry will be on a plateau of relative calm for five to six years."

The introduction of the 80386 computers is a development which Doug Michels, Vice President of the Santa Cruz Operation, developer of SCO XENIX, called "a major breakthrough in price/performance computing, which will be held back due only to a lack of understanding as to the potential of the new microprocessor. People haven't seen how radical this breakthrough is because everybody insists on looking at both 80286 and 80386 machines as single user workstations," Michels explained. "What they miss is that with this much power, a lot of the computing that has traditionally been done with larger computers, will now be possible on a microcomputer."

The importance of being standardized

The widespread acceptance of the the IBM PC began an industry-wide move toward standards. These standards have given the computer industry a sense of order and direction. Users, Michels said, have "seen the benefits of an industry adopting standard hardware, software and operating systems." From the user's point of view, a computer's value is based on having a wide range of software from which to choose.

According to Gates, although many standards have been set, there is a gap in standardized operating systems. "At the low end for single user systems, the standard clearly is MS-DOS and that will continue," he said. "At the very high end, machines costing more than three million dollars, IBM has set several key standards." It is in the middle area above MS-DOS and below mainframes where confusion exists as to what the standard operating system will be. "Microsoft expects that middle tier will be standardized by the UNIX/XENIX operating system," Gates predicted.

Looking to the future of standards and Tandy computers, Tandy Corporation President, Chief Executive Officer and Chairman of the Board, John Roach, sees the MS-DOS standard continuing because, as he said, MS-DOS is "the standard of compatibility the software industry is really supporting." He assured users that as the OS/2 operating system comes into play, Tandy computers will support new standards of compatibility. Roach further stressed the company's commitment to the XENIX community, a sector of the microcomputer marketplace where Tandy has long been a major force.

Operating systems + applications = confusion

Now that standards are being set in the multiuser arena, the debate—and a lot of confusion—continues over when it is best to use multiuser systems, when it is best to use local area networks and when it is best to run stand-alone DOS. Michels gave his views on the XENIX/LAN/DOS controversy pointing out the applications best suited for each operating system.

"There are many things that you can do on a LAN that you can't do on a multiuser system," Michels said. "If you need to run graphics software, the best bet is a single user DOS system. If you need to share resources, disks and printers, it is best to do that on a LAN. If you want to do word processing, accounting and database, a multiuser system is perfect and actually performs better than LANs."

In Michels' opinion, when the goal is shared access to data, desktop PCs—even if networked—are not the answer. "To share data on a small multiuser system is a problem which has been well solved because the solutions have evolved over fifteen years," Michels said.

All for one, workgroup solutions

As networking becomes more pervasive, it will, like other forms of technology, become more standardized. Before that can occur, however, some important market requirements will need to be satisfied to enable the network industry to move forward.

Being an advocate of connectivity, Roach called the industry to action saying, "It is clearly time for networking to become a reality." While the industry continues to wrestle with the issue of connectivity, Roach said, it is clear that the need is to connect the total world through networks, multiuser systems and any number of other protocols that are important to users today. Reinforcing Radio Shack's commitment to both value and connectivity, Roach said, "Our goal is relatively simple: To make connectivity of our hardware as simple as possible and do it on a building block basis so end users are not forced to invest in more connectivity than they need."

A major part of Radio Shack's connectivity strategy involves the 3 + product family from 3Com Corporation. William Krause, 3Com's President, presented his views noting, "We have to continue to maintain an open systems architecture. We must make progress in ease of everything and promote full connectivity which is both connection and communication."

Workgroup computing technology, Krause said, is being driven by networking technology being used in two kinds of applications, low bandwidth and high bandwidth. Low bandwidth applications are data entry, transaction processing, inventory control and accounting. High bandwidth applications allow an emerging type of computing that is both graphics and network intensive and is oriented to office productivity.

"People are buying networks for primarily economic reasons," Krause emphasized. "They want to gain the benefit of cost reduction by sharing expensive peripherals such as disk drives and printers." Another reason

for networking is having the ability to run high bandwidth applications, such as computer-aided design and desktop publishing and to exchange information from the workstation and the workgroup server.

Another key direction touched upon by Krause dealt with connectivity. "I think we have discovered that people in business do not work standalone and they want to communicate as much as they need to compute," he said. "When considering a workgroup computing system, open systems architecture, whether it is based on DOS or UNIX, is important because it gives users the freedom and flexibility to pick and choose the application tools, both hardware and software, that best suit their needs."

"For single user systems, the standard is clearly MS-DOS and that will continue."

Workgroups + multiuser = the future of computing

Although there will continue to be users wanting to do stand-alone computing, and others wanting to use multiuser business applications, a higher percentage of users will want to do both. Accommodating users who desire both will necessitate the ability to run XENIX and MS-DOS on one network. Being able to access shared files on a server that is running either MS-DOS, XENIX or OS/2, Gates believes, will be the key to growth in the area of local area networks.

For those whose computer needs can't be solved by choosing between DOS or XENIX, there's good news: XENIX and DOS can coexist. According to Michels, a common coexistence solution is sharing a hard disk through partitioning. XENIX has a wide range of utilities that move data back and forth between partitions.

A more advanced alternative is XENIX-NET, a merge between multiuser and LAN that allows a local area network, a multiuser system and single user systems to be combined and interoperating. "I think, ultimately, most people, instead of using terminals or in addition to using terminals,

will use PCs as desktop workstations," Michels said.

Other glimpses of the future

A revolutionary form of storage, optical storage, promises to take hold in the next few years. Known as compact disk read only memory (CD-ROM), the technology uses digital encoding to store up to 540 million characters of information, more than enough to store the *Encyclopaedia Britannica*, on a single disk. "CD-ROM is going to allow us to make the PC much more of a multi-media device," Gates said.

"If you had to describe the one single application that we're really trying to make sense out of, it's this idea of the integrated office," Gates said. "You have stand-alone PCs, you have UNIX-based machines, you have minicomputers; but it's not easy enough to set up systems so that it really makes sense to have a computer on every desktop."

In closing, Roach, who has been a major force behind Tandy computers since research and development was conducted on the Radio Shack TRS-80 in 1976, stressed Tandy Corporation's continuing commitment to deliver value, not just products, to end users. "We believe that we can firmly declare that we, more than any other MS-DOS compatible manufacturer, are selling value, not just boxes," Roach said. By drawing from more than ten years of experience in the microcomputer industry, Roach said, Tandy Corporation will continue to "provide hardware features that clearly differentiate our products in the marketplace."

The computer of your dreams

In summary, Gates visualized what the dream machine of the future might be. "I see the single user workstation continuing to be based on an evolution of DOS, which now is OS/2. I see it having a graphic user interface and almost always being tied to a network. I really think that the pointing device, like the mouse, will become increasingly popular. I see all of these things coming together to create fantastic single and multiuser workstations.

"I really believe that personal computers, for both large and small companies, will become a fundamental part of how that company does business. Of course, if that comes true, it will be very exciting because it means that although personal computing has grown a lot over the last five or six years, there will be a lot of growth ahead of us."

Putting the byte into crime fighting

Tandy computers provide an innovative edge for police investigations.

Technology touches every aspect of our lives, sometimes without our ever realizing it. Such is the case with the Lakeland, Florida, Police Department where a Tandy 102 laptop computer is becoming standard issue equipment to field personnel.

Since the introduction of laptop computers, officers complete their paperwork in about half the time. What does this mean to the citizens of Lakeland? It means police personnel are able to return to their patrol and investigative duties 50 percent faster.

After some experimentation, Officer Joe Salvadore, computer coordinator for the Lakeland PD, decided to investigate a program the St. Petersburg, Florida, Police Department had developed for Radio Shack Model 100 portable computers with a state grant. (See *Answers*, Winter 1986).

After further evaluation of the St. Petersburg program, Lakeland purchased 67 Tandy 102s for field personnel in October 1986. The department also purchased a Tandy 3000 HD with a 40 megabyte hard drive, the XENIX operating system, and three DT-100
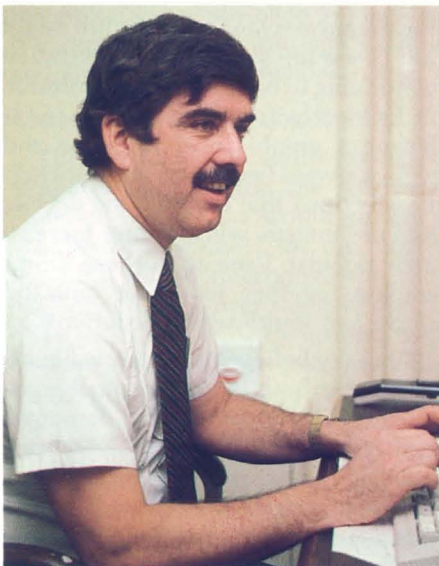
Using computers, Joe Salvatore has streamlined the department's paperwork.
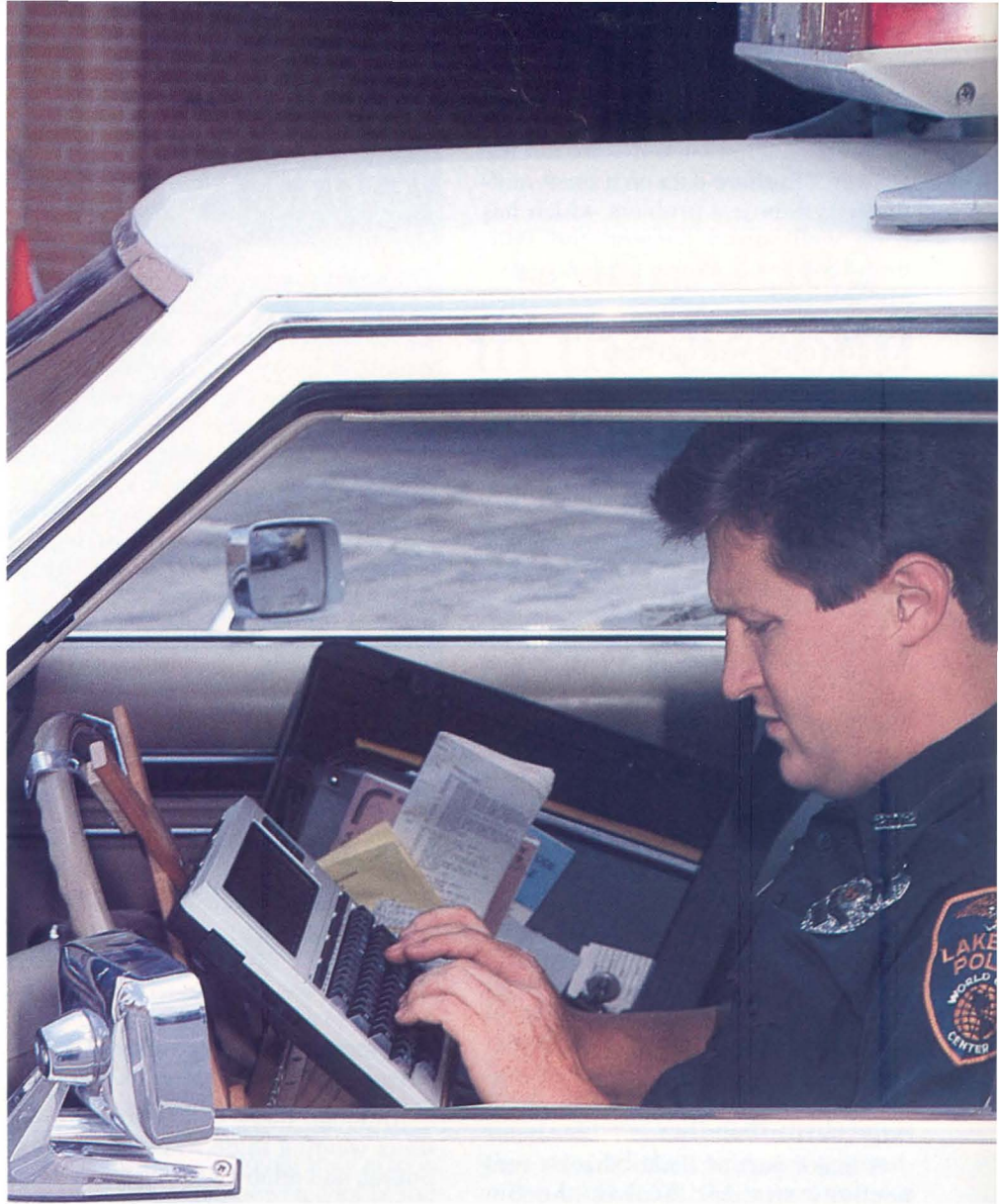
terminals. The Tandy 3000 acts as a file server storing all reports written on the laptops. The report generator program installed in the 102s is a version of that used by the St. Petersburg police. Since the program is written in BASIC, it is a straightforward process for police agencies to change the program to meet their specific needs, according to Salvadore.

The Tandy 3000 uses a program specially developed by a police supply company for police departments using laptop computers. The program also runs under XENIX.

"The software allows officers to send their reports to be electronically manipulated by division supervisors at the station," Salvadore explained. "It divides the department into three divisions—patrol, criminal investigation division (CID), and special investigation unit (SIU). As a result, information is assured of being routed to the proper division."

Laptop literacy

Before officers are issued a Tandy 102, they must attend a 40-hour training course conducted by Officer Salvadore. In the course, they are taught computer literacy including how to write, edit, send and retrieve reports. They also receive information on computer crime.

"Currently, 57 percent of Lakeland's 146 sworn police personnel who generate reports do so on a Tandy 102," Salvadore said. "We plan to have every officer equipped with a 102. In fact, we are including the cost of the computer in the overall cost of outfitting a new recruit."

When an officer accesses the Tandy 3000 via laptop computer, he is asked for a badge number, his password and division. Each time an officer makes a call, he is required to file a report which is assigned an event, or incident, number. When the officer is ready to

file a report, he again enters his division and the report event number which the Tandy 3000 HD validates. Reports are transmitted either through one of three direct connect lines in each division or externally over the telephone line.

Additionally, the division supervisor responsible for approving reports can log onto the system at any one of the terminals in the department. The supervisor may review reports by keying in the corresponding report number. The computer brings the report up on the terminal screen exactly as it appears on a printed page. After reviewing the report, the supervisor will

Archived incident reports can be accessed via a data terminal.

approve or disapprove the report and a printout is made. A DMP-2100P prints three copies of all approved reports and one copy of disapproved reports. The supervisor circles the areas on a disapproved report that need correction and returns the report to the officer who then makes his corrections on his 102.

Information search and seizure

The Lakeland PD has taken its application a step beyond that of St. Petersburg by using the Tandy 3000 HD to provide electronic archival storage of the department's more than 5,400 reports to date. The computer will list all approved and disapproved reports by event number. A built-in accounting system keeps track of who signs on, when and the amount of time spent on the system.

Officer Salvadore says one of the many advantages of the system can be seen when making investigative inquiries. "We can do a single, double or triple word search on all reports in the system. The Tandy 3000 will list the

reports by event number that meet the search criteria and generate a printout of the first three lines of every report found in the search."

According to Salvadore, there have been arrests made based on investigative inquiries using the information stored in the Tandy 3000. "For us to make a request from central data processing usually takes at least 24 hours," Salvadore explained. "Even then, central DP does not store the entire report like we do here."

Newly-appointed Chief of Police Ronald Nenner was commander of CID when the computer project went into effect. "Because of the nature of our investigations (in CID), we generate a lot of paperwork," he said, adding that they have received many positive comments on the project. "The State Attorney's office is very happy with the system. They have commented on how much easier it is to read our reports now, since there are very few mistakes or spelling errors."

Big bucks benefits

Not only has the system proved to be a time saver, but the department has also seen actual cost savings. According to Salvadore, the department had been -ordering report forms on a monthly basis. In October and November 1986, the department spent $1,150 and $1,350 respectively on report forms. In December, however, the amount dropped to $55. As of April 1987, the department still had a sufficient supply of forms for officers who had not received their 102s and were still doing reports by hand. "We're saving big bucks just in report forms and correction fluid," Nenner added.

Currently, the department uses a system which may require up to four forms to complete one report. The 102 can typically take a five-page form and reduce it to one page, using only those modules within each report that are needed. "The average report is five pages," Salvadore noted. "This year, we made 50,000 service calls, of which 20,000 will probably result in a paperbound report at a cost of approximately 50 cents per report. The computer will generate a single page of a report at seven-tenths of a penny per page. There's an immediate cost savings."

The reactions from officers have been very favorable. The laptops have been so popular that, when a rumor started that the computers were going

to be removed, many officers began asking Ray Dils, manager of the local Radio Shack Computer Center, to talk with Officer Salvadore and persuade him to keep the laptops.

The system is used for more than just archiving and processing reports. On the Tandy 3000, the staff sergeant uses the filer program on DeskMate II for inventory purposes. Additionally, officers have discovered the convenience of using electronic mail to leave messages for officers on other shifts.

A 40-hour computer course is now part of an officer's training.

Lakeland has plans for its system, which is under study by several local police departments and the sheriff's department. One feature Lakeland hopes to implement soon will aid local newspapers in obtaining police information. Currently, when a report is approved, the system will ask if the information is to be released to the press. If so, the system removes the phone numbers and addresses of suspects and victims listed and places the information in a "Press File." Once additional coordination activities are completed, newspaper reporters can call in and retrieve the information electronically.

A long term goal is to network the entire county to facilitate easier and timelier exchange of information among law enforcement agencies.

"We are really happy with the system," Salvadore concluded. "The officers like them because they can get their paperwork done in about half the time, which means they have more time to do the rest of their job— protecting citizens."

Keeping havens "hassle-free" for

Relatively inexpensive gasoline prices and discounted airline fares have created a prosperous boom in the travel and tourism industry. The economic impact associated with this thriving trade has spawned a competitive spirit among hotels, motels and resorts eager to offer a little "rest and relaxation" to today's traveler.

Regal 8 Inns, a motel chain headquartered in Mt. Vernon, Illinois, has captured a sizeable portion of that

The Model 100 is a mainstay in Regal 8 lobbies nationwide.

market with an ingenious plan to provide "hassle-free" service and comfortable accommodations to its patrons at a fraction of the usual cost.

When the company opened its first property in 1970 in Paducah, Kentucky, the concept of a mid-priced motel with more than adequate services appealed to many travelers. Today, Regal 8 Inns operates 52 properties in 21 states employing more than 1,000 people nationwide. As the company grew rapidly, the need for computer-based operations became apparent.

"In 1981, during inflationary times, we had some very difficult pricing decisions to make," explained D. Bruce Geary, President of Regal 8 Inns. "I went to a Radio Shack and bought our first microcomputer, a TRS-80 Model III, and VisiCalc software to build a pricing program for about thirty different properties at the time."

Geary readily admits his knowledge of computers was limited. He had seen demonstrations and read articles. "I stayed up that night and read the manuals and went through the program. Rather than building a fictitious example, I developed a model for our business. We still use that same program today, but that was only the beginning."

Reservations central

To record more than 200,000 reservations annually and track countless telephone calls made from more than 6,000 rooms, Regal 8 Inns resolved to

computerize operations nationwide and developed two very unique applications. The company's reservation center, located in Centralia, Illinois, is designed totally around the Tandy 6000 multiuser business computer.

"We started with the Model 16 and upgraded to the Tandy 6000. We needed the multiuser capabilities and,

Discussing future plans are (left to right) Gene Rogers, David Perschbacher, P.V.J. Rao and Bruce Geary.

quite frankly, there were very few companies in the multiuser market," said Geary. "Tandy was very inventive when they introduced the Tandy 6000 computer. We've used it to its capacity with the XENIX operating system."

The system, though somewhat complicated in design, is simple and effective peformance-wise. When the reservations operator receives an inquiry, regardless of whether or not a reservation is made, the information is entered into a DT-100 terminal and transmitted to the primary Tandy 6000. This computer is equipped with an internal 15 megabyte hard disk and an external 35 megabyte hard disk. A second identical Tandy 6000 con-

weary travelers
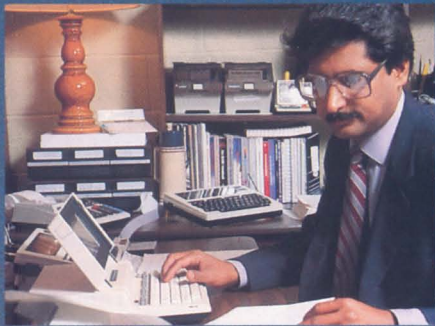
Rao has found the Tandy portables nearly indispensable.

nected to the primary system also receives the information.

"We've created a redundant parallel system that backs itself up automatically for continuous operation," said Geary, "but, based on our experience with Tandy's product reliability and service, the duplicate system isn't really necessary."

"Reservation problems really come down to the human element. We just don't have problems mechanically with the equipment," added Gene Rogers, reservation center manager.

A third Tandy 6000 computer with two internal floppy drives and an external 15 megabyte hard disk is connected to the secondary Tandy 6000 and is used only as an outbound terminal. On both a national and in-state WATS telephone line, the third computer builds a report every two hours which includes reservations, changes and/or cancellations and sends the information to each Regal 8 Inn across the country.

Portables and paper work

With the exception of hard copies of records, computerizing the reservation center has virtually ended time-consuming paper work and, thus, reduced labor costs. Each Regal 8 Inn office is equipped with a 32K Radio Shack Model 100 portable computer and a DMP-105 printer to receive and document reservation information.

A custom accessory designed by management personnel, P.V.J. Rao and David Perschbacher, allows the Model 100 to automatically answer the telephone. If, for any reason, the computer does not receive the information, the reservation center is immediately notified and the situation corrected within minutes.

Regal 8 has also implemented the Model 100 into its telephone accounting system. Several years ago, deregulation in the communications industry allowed not only private ownership of telephones but also spelled out major changes in telephone billing for the motel/hotel industry. For example, if each Regal 8 Inn had direct-dial telephones installed and was equipped to collect telephone usage data, substantial savings in operator assistance costs would be realized.

"Rao got very involved in designing a computer system that would load the call information into the computer, calculate the minutes, determine where the call went and price out the call," said Geary.

The software program, written in BASIC, tracks and prices every telephone call made from the motel by room number. According to Geary, the in-house system and Tandy computers have reduced the cost per installation 75 percent over comparable commercial call accounting products.

"Eighty percent of our properties now have cost accounting systems using Model 100 computers. They provided the battery backup capabilities we needed," explained Rao. "That's the reason we went in that direction."

Reservations operators busy in the Centralia Reservations Center.

Data and messages concerning payroll, night audits and supply requests can also be transmitted to the corporate headquarters via the Model 100. The company is currently testing and assessing this application.

Regal 8 Inns' future project is to implement computer-based cash registers throughout the chain. Once again, the company has chosen Tandy computers. "All of our future cash registers will be either Tandy 1000 SXs or Tandy 3000s," concluded Geary.
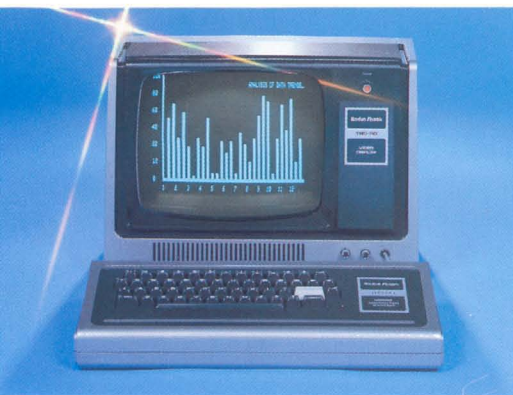
From TRS-80 to Tandy: Ten years of leadership in personal computing

TRS-80, 1977

Model II, 1979

Model III, 1980

Color Computer, 1980

Pocket Computer, 1980

Model 16, 1982

Model 12, 1983

Model 4, 1983

Model 100, 1983

"We weren't exactly sure who we were going to sell them to, but it was fairly clear to me that microcomputers had great potential with our traditional customers." Thus reflected John V. Roach, President, Chairman of the Board and Chief Executive Officer of Tandy Corporation, speaking of his company's foray into the microcomputer industry a scant ten years ago in 1977. The introduction of the Radio Shack TRS-80 on August 3 of that year not only had a profound effect on the corporation, but also contributed to a revolution in society which would ultimately lead to the Age of Information.

While microcomputers were available prior to 1977, they were mostly in kit form. The introduction of ready-to-run preassembled computers like the Radio Shack TRS-80, Apple and Commodore PET, laid the foundation for the movement of microcomputers into businesses, schools and homes on a large scale. Recalling the product introduction at the Warwick Hotel in New York City, Roach gibed, "There wasn't much computer media then. In fact, most of the media didn't know what a microcomputer was, much less care."

By December 31, 1977, Radio Shack had delivered 5,000 TRS-80s, 4,000 units more than originally intended for production. "We thought we were really doing something," chuckled Roach. One distinct advantage the company had was its nationwide distribution chain of over (at that time) 3,000 Radio Shack electronics stores.

But getting the word about microcomputers to the public through stores wasn't enough. The February 1978 issue of *Time* magazine featured

Tandy 2000, 1983

"The Computer Society" which served to raise public interest in computers. It was at that same time that Radio Shack took to the road in a whirlwind of modern day barnstorming to introduce the public to its microcomputers through a series of computer shows staged in over 100 major cities from coast to coast.

As the public's awareness of microcomputers gained momentum, the business world began to take notice. Even the major computer companies with mainframe computers as their mainstay became attentive as microcomputers began to appear in data processing and other areas performing a variety of tasks in all types and sizes of businesses.

Anticipating this trend, Radio Shack was ready to accommodate business users and in May 1979, introduced the Radio Shack TRS-80 Model II as a professional, business-oriented microcomputer complete with built-in disk drive, 80-column screen, and a proprietary TRS-DOS operating system. "There were significant improvements in technology which allowed us to produce the Model II at such a low cost for that time period," said Dr. John Patterson, Senior Vice President, Tandy Computers. "We definitely had a specific market in mind for that machine."

It was this kind of planning and strategy that resulted in Radio Shack having one-fifth of the microcomputer marketplace in these vintage years. 1979 also marked the introduction of VisiCalc, a major spreadsheet software effort that provided the conduit for management information systems (MIS) managers to justify bringing micros into the office. Bill Gates and his entrepreneurial Microsoft Corporation continued to gain recognition as a driving force in the software sector of the industry having been instrumental in the development of BASIC for Radio Shack and other pioneering computer companies.

1980 saw the appearance of micro systems from new companies as well as established mainframe companies. Radio Shack introduced the Color Computer, targeted to the home users; the Pocket Computer I for students and field-oriented professionals; and the Model III, an updated version of

the original TRS-80 but with the screen, keyboard and CPU all in one unit, a feature that would lead to that machine's acceptance into the education market. (See page 24)

The credibility culprit

Despite undercurrents which would eventually sweep microcomputers into the homes, schools and businesses of America, credibility, recognition and widespread acceptance were slow in coming due in part to competition among proprietary operating systems and the lack of a defined and accepted standard.

Roach recalled, "It was as if microcomputers weren't reality. It wasn't until around 1980 and '81—probably with the IBM PC announcement—that the industry began to get some attention, some legitimacy. And, of course, then the press got involved." To Roach, the IBM announcement was important because "all these computers were getting into businesses. But they weren't coming in through the front door; the employees were bringing them in and using them on their own. With IBM's announcement, the MIS directors had the opportunity to regain control of what was going on in their operations."

IBM's entry into the personal computer market in 1981 did indeed seem to give the machines instant credibility in the business arena which in turn threw open the doors of education which would need the machines to prepare students for the future. These events in turn made micros *de rigueur* in the home.

New and sophisticated were the watchwords of the ensuing boom years for personal computers as software developers like Lotus Development Corporation rushed to take advantage of IBM's open architecture and start-up hardware companies like Compaq began cloning the machine.
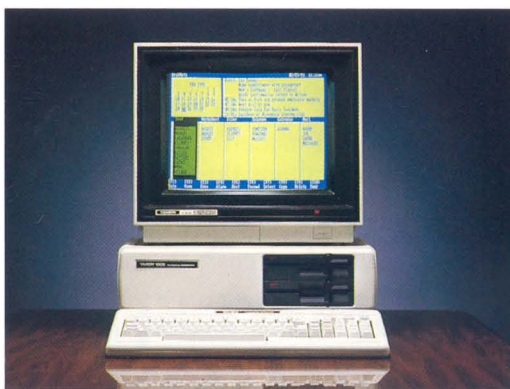
Radio Shack quietly stood as a beacon providing quality products with value pricing backed by an extensive service and support network it had been steadily building. The introduction of the Model 16 in 1982 and subsequently the XENIX operating system moved Radio Shack into the 16-bit world.

Tandy 6000, 1984

Tandy 1000, 1984

Tandy 3000, 1985

"It was a decision process of selecting what we thought would be the operating system of the future," said Dr. Patterson. "The CPU, operating system and applications software all go together and there was more software written for UNIX at that time in the mini world. A good deal of that software was written in C. By using XENIX, we could recompile a lot of the C applications and move them right into the Model 16 very quickly." Subsequently, Radio Shack soon boasted the largest installed base of XENIX users in the nation.

More to come

In 1983, Radio Shack introduced over ten new computer configurations including the Models 4, 4P, 12, Color Computer 2 and the Radio Shack Model 100 portable laptop computer which became an overnight success, particularly with journalists who liked its convenient size, weight, built-in software and modem. The Tandy 2000, Radio Shack's first MS-DOS compatible computer, heralded the computer product line nomenclature change from Radio Shack to Tandy.

Marking the significance of microcomputers, *Time* magazine named the personal computer "The Machine of the Year" for 1983, a year that was to be fraught with failures and a resultant slump in the industry as users became disillusioned and more demanding.

Determined to maintain its place as a leader in the microcomputer industry, strategists at Radio Shack surveyed the marketplace, made a decision and announced its entry into the PC-compatible world in November 1984 with the introduction of the Tandy 1000. Within a year, that machine was the number one selling PC-

Color Computer 3, 1986

Tandy 1000 EX, 1986

compatible. "As in the past, we proved ourselves to be the price/performance leader, especially in terms of features and functions we provide initially as opposed to being 'add-ons' from other manufacturers," noted Roach.

In 1985, Radio Shack went itself one better by making the Tandy 1000 the first PC-compatible to sell for under $1000. Radio Shack virtually had something for everyone from Color Computers and laptops to PC/XT and PC/AT compatibles, XENIX and network systems.

Never one to rest on its laurels, Radio Shack reinforced its status with more new product introductions in 1986. The Tandy 1000 SX and EX, the Tandy 3000 HL and the Color Computer 3 were but some of the products designed for the business, education and home markets. With the addition of the 3Com workgroup products in 1987, Radio Shack reassured its position as a leader in the computer industry.

But product is not Radio Shack's only focus. Over the years, management has formulated the parameters

Tandy 3000 HL, 1986

for a superior service and support organization. Sales strategies incorporated the addition of an outside sales force 1,200 strong and reinforcement of value added reseller programs.

Radio Shack has been bringing the products of technology to market for over 66 years. As the company enters its second decade in computers, the market will continue to turn to Radio Shack for quality, compatibility, technology, connectivity and longevity. That's why there is no better value than Tandy computers.

Left: *Technicians man the media control room.* Above: *Notables from the industry watch the film presentation.*

Simulcast highlights Tandy's press conference

Enthusiasm was running high in the Waldorf-Astoria Hotel on Monday, August 3, 1987. Not even a New York summer shower could dampen the spirits of Tandy Corporation and Radio Shack executives who had called a press conference to commemorate the company's ten years as a leader in the computer industry and to introduce major new Tandy computer products.

Using simulcast satellite technology, the conference began with an upscale multi-media visual presentation which depicted a short history of the computer industry. At the film's end, Tandy President, CEO and Chairman John V. Roach bounded to the podium and welcomed the capacity crowd of over 300 journalists and security analysts.

Roach also welcomed some 2000 Radio Shack field personnel who were taking part in the festivities via satellite at the annual meetings of the company's Business Products Division in Dallas, Texas, and of the Western Division, Consumer Products in Anaheim, California.

Above: *Tandy Chairman John V. Roach began the proceedings which were attended by a capacity crowd (right).*

This simulcast event marked the first time field personnel had participated in major new product introductions. Radio Shack President Bernie Appel addressed the conference from the Dallas meeting and introduced Bob Myers, Vice President, Business Products. The enthusiasm of the field people was obvious as their cheers and applause were projected to New York and Anaheim.

In addition to Roach and Appel, Tandy executives making presentations in New York were Dr. John Patterson, Senior Vice President, Tandy Computers; Dr. Scott Cutler, Senior Director, Software; and Mark Yamagata, Senior Director, Computer Products. Radio Shack's commitment to software compatibility was emphasized by presentations from Bill Gates, Chairman, Microsoft; William L. Krause, President and CEO, 3Com Corporation; and Paul Brainerd, President, Aldus Corporation.

Below: *Radio Shack President Bernie Appel at the podium in Dallas, Texas, with Roach from New York on the screen.*

Other industry dignitaries in attendance included Bruce Bastion, Chairman of the Board, WordPerfect; Bruce Davis, CEO, Activision; Ed Esber, CEO, Ashton-Tate; Fred Gibbons, President and Chairman, Software Publishing; Dennis Hayes, President, Hayes Microcomputer Products; Roger Johnson, President, CEO and Chairman of the Board, Western Digital; W.M. "Trip" Hawkins, President and Chairman, Electronic Arts; and Bob Metcalfe, Chairman of the Board and Senior Vice President, Technology, 3Com.

Below: *Media representatives interview the Tandy CEO.* Right: *Thumbs up from Philip Haley, Manager, Radio Shack TV/AV Department indicate the event's success.*

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The new look of

On August 3, 1987, at the Waldorf Astoria Hotel in New York City, Radio Shack announced the latest additions to its best-selling line of PC compatible computers and a state-of-the-art laser printer. These products reinforce the company's position as a leader in the personal computer industry. With a product line that covers most any application, the new Tandy computers lead the way in quality and technology—at prices that are extremely competitive.

The Tandy 4000
80386 power for today and tomorrow

Based on the Intel 80386 microprocessor, the Tandy 4000 microcomputer rivals mainframes and minicomputers for speed and functionality. In fact, literature on the Tandy 4000 describes performance in MIPS—a mainframe term specifying Millions of Instructions Per Second. (The Tandy 4000 is rated at almost 3 MIPS, versus less than 1 MIPS for an 8 MHz PC AT.)

The four mode, 32-bit microprocessor allows MS-DOS software designed for the IBM PC and AT to run at a much faster 16 MHz clock speed.

Additionally, when new operating systems become available, such as OS/2, the Tandy 4000 will deliver the full potential of the 80386 processor.

The Tandy 4000 is outfitted with a 1.4 megabyte, 3½" disk drive. Two additional internal disk drives can be added with any combination of 3½" drives, 5¼" drives, hard disks or disk cartridges. Incorporating single in-line memory modules (SIMM), one megabyte of memory is standard and memory is expandable to four megabytes. Using one-megabit chips, total system memory can be expanded to 16 megabytes. The Tandy 4000 is the computer of the future.

The Tandy 1400 LT
### MS-DOS power in a portable computer

MS-DOS compatibility is only the beginning for the Tandy 1400 LT laptop computer. Because it's portable, popular programs like Lotus 1-2-3 or Microsoft Word can be used virtually anywhere. In the office, the Tandy 1400 LT is as powerful and functional as a desktop computer.

One of the most notable features of the 1400 LT is its display. While many laptops have standard Liquid Crystal Displays (LCD), the 1400 LT's 80-character by 25-line display utilizes the latest backlit "supertwist" LCD technology for sharp resolution and easier reading in low light.

The 1400 LT comes with two 720K 3½" disk drives which provide over 1.4 megabytes of disk capacity. The 1400 LT runs at a fast 7.16 MHz clock speed. That's 50 percent faster than most other PC-compatible laptops. Despite its impressive capabilities, the 1400 LT weighs only 13½ pounds and has a convenient carry handle for true portable computing power.

computing power
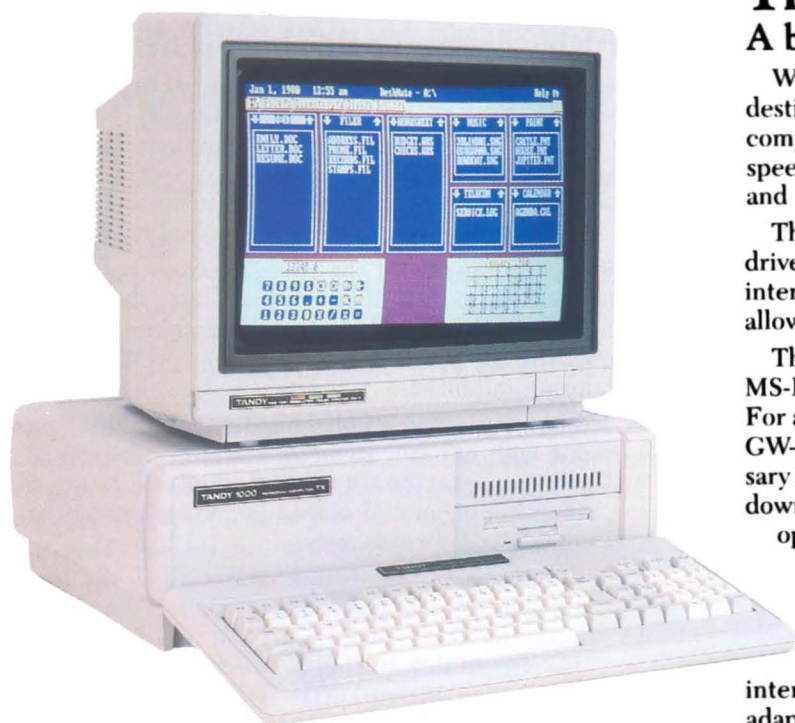
The Tandy 1000 TX
A breakthrough price for 286 technology

With an 80286 microprocessor, the Tandy 1000 TX is destined to change the rules by which price/performance computing will be judged. With the 80286, the processing speed of a TX is over six times faster than a standard PC XT* and over three times faster than the IBM Model 30.

The Tandy 1000 TX is designed with a durable 3½″ disk drive which can store 720,000 characters of data. A second internal 3½″ disk drive or a 5¼″ disk drive can be added allowing the system to be tailored to the needs of the user.

The 80286 8 MHz microprocessor runs all the popular MS-DOS programs faster than standard 8088-based PCs. For added value, the Tandy 1000 TX includes MS-DOS 3.2, GW-BASIC and Personal DeskMate 2—everything necessary to begin computing. Personal DeskMate 2 features pull-down menus and "dialogue boxes" that make selecting operations easy, a new Music program and Paint function, in addition to text, spreadsheet, database and calendar programs.

The Tandy 1000 TX comes standard with 640K RAM. Five card slots make it easy to expand with an internal modem, a 20-megabyte hard disk card, or an adapter for connecting to a workgroup environment. Adding more value, the TX includes many features that cost extra on other PCs—monochrome and color graphics, a parallel printer adapter, two joystick adapters, a headphone jack with volume control and an RS-232C serial port.

The Tandy 1000 HX
No more loading MS-DOS from disk

The innovative spirit behind Tandy computers is evident in the 1000 HX, the first desktop computer designed for home use with MS-DOS in ROM built-in. When powered on, MS-DOS is loaded automatically and is ready to run. This ease of operation plus the low cost makes the Tandy 1000 HX ideal for the home or classroom.

The 1000 HX has a number of features including 256K RAM, a 3½″ 720K disk drive and room for a 3½″ second internal disk drive. For maximum flexibility, the HX also supports an external 5¼″ disk drive. Also included is a three-voice sound circuit for generating music, and a headphone jack with volume control. The PC-compatible HX runs all the popular MS-DOS programs.

The Tandy 1000 HX comes with Personal DeskMate 2, an enhanced version of the versatile six-in-one Personal DeskMate program. In the tradition of all Tandy 1000s, the HX offers conveniences that cost extra on other PCs including adapters for joysticks, monochrome and color monitors and a printer.

Based on Norton Utilities Computing Index Version 4.0.

The Tandy LP 1000
Affordable desktop publishing is here

As part of a complete desktop publishing package or as an addition to existing computer hardware, the LP 1000 laser printer makes any printed computer output sharper, clearer and more professional looking. Now, spreadsheets and word processing manuscripts can be produced with near typeset quality at a fraction of the cost of professional typesetting.

When used with one of the many desktop publishing software packages, the LP 1000 produces laser-sharp originals using a combination of both text and graphics. With all its features, the LP 1000 is designed to make printing possibilities almost unlimited.

In addition to desktop publishing, the LP 1000 is compatible with industry standard software packages allowing typeset quality printing of all types of computer-generated output including word processing and spreadsheets.

Portrait and landscape modes allow the handling of a variety of printing jobs. Users may select from the four resident fonts and two downloadable custom software fonts. The resident fonts, Letter Gothic, Prestige Elite, Courier and Century PS, available in 10, 12 and 16.7 pitch, are selected from the front panel or via the software. Users may also select the graphics mode offering 300×300 dots per inch on a full page.

The LP 1000 operates quietly while handling jobs such as newsletters and brochures. Correspondence that once had to be contracted outside can now be conveniently produced in the office at a rate of up to six pages per minute. In addition to its quiet operation, the LP 1000 is compact, requiring no more space than conventional printers.

The Tandy LP 1000 includes a controller board as a standard feature, as well as 1.5 megabytes of memory for full page graphics printing—a welcome alternative to high priced "extras." Included in this standard controller are emulations for Tandy, IBM Proprinter, IBM Wheelprinter and the HP Laser Jet Plus.

System Overviews

Tandy 4000

Microprocessor: *Intel 80386 with 32-bit data path.*
Clock Speed: *16 MHz. Object code compatible with 8086/8088.*
Operating System: *Optional MS-DOS 3.2 with BASIC or XENIX System V.*
Memory: *1 megabyte RAM (expandable to 4 megabytes). Total system expandable to 16 Mb using 1-megabyte SIMMs.*
Keyboard: *101-key enhanced keyboard.*
Disk Drive: *3½" floppy disk drive (1.4 megabytes). Three front drive slots.*
Display: *Optional high-resolution non-glare, non-interlaced, 12" monochrome (green) or 14" color monitor (80 or 40 characters per line by 25 lines).*
Internal Expansion: *Six AT and two XT slots. One dedicated 32-bit memory expansion slot. Optional 80287 math co-processor can be added. One XT-slot used for serial/parallel adapter (included).*
External Connections: *Standard serial and parallel ports.*

Tandy 1400 LT

Microprocessor: *NEC V-20 (8088 equivalent).*
Clock Speed: *7.16/4.77 MHz (switchable).*
Operating System: *Includes MS-DOS/GW-BASIC 3.2.*
Memory: *768K RAM, 16K ROM. 640K accessible by MS-DOS, 128K available for RAM-based disk drive or print spooler.*
Keyboard: *Full-size, 76 keys.*
LED Indicators: *Caps Lock, Num Lock, Low Battery, Scroll Lock, Standby Mode.*
Display: *Backlit "Supertwist" LCD, 640×200 pixels, 80×25 characters, aspect ratio 1:1.4. Optional RGBI color monitor.*
Disk Drives: *Two internal 720K 3½" double-sided, double density.*
Modem: *Optional 1200-baud, Hayes-compatible modem.*
External Connections: *AC adapter, parallel printer, serial port, RGBI color monitor, composite video out, external disk drive, enhanced keyboard.*
AC Adapter: *15 VDC 700 mA, UL listed.*
Battery: *Removable, rechargeable, 12 volt, 2200 mAh. Extras available.*
Other Features: *Battery-powered clock/calendar, standby mode and speaker.*
Dimensions: *14.5×12.4×3.5".*
Weight: *13.5 lbs.*

Tandy 1000 TX

Microprocessor: *Intel 80286.*
Clock Speed: *8/4MHz, software selectable.*
Operating System: *MS-DOS 3.2 with GW-BASIC.*
Memory: *640K RAM, expandable to 768K (640K for MS-DOS, 128K for video memory). Includes power-up diagnostics.*
Keyboard: *Integral 90-key sculptured, including numeric-entry pad.*
Disk Drive: *One double-sided, double-density 720K 3½" floppy.*
Video Modes: *Text: 80 or 40 characters per line by 25 lines, 256 character types. Graphics: CGA compatible with enhancements; 640×200 pixels, 4-color; 320×200, 16-color.*
Internal Expansion: *Five user-accessible IBM PC-compatible card slots (10" maximum length). 80287 math co-processor. Second (3½" or 5¼") disk drive.*
External Connections: *Standard parallel adapter, composite video out, line level audio out, RS-232 serial port, two joysticks, RGBI color monitor. ⅛" headphone jack with volume control.*

Tandy 1000 HX

Microprocessor: *Intel 8088-2.*
Clock Speed: *7.16/4.77 MHz, software selectable.*
Operating System: *MS-DOS 2.11 with GW-BASIC.*
Memory: *256K RAM, expandable to 640K. Includes 128K ROM and 256 bits EEPROM with MS-DOS resident, BIOS, diagnostics, system configuration and user interface.*
Keyboard: *Integral 90-key sculptured, including numeric-entry keypad.*
Disk Drive: *One double-sided, double-density 720K 3½" floppy.*
Video Modes: *Text: 80 or 40 characters per line by 25 lines, 256 character types. Graphics: CGA compatible with enhancements; 640×200 pixels, 4-color; 320×200, 16-color.*
Internal Expansion: *One "PLUS" style expansion board or two "PLUS" style expansion boards when used with Memory PLUS Expansion Adapter (25-1062). Second 3½" disk drive.*
External Connections: *5¼" 360K or 3½" 720K external disk drive, standard parallel adapter, composite video out, RGBI color monitor, ⅛" headphone jack with volume control, two joysticks.*

Tandy LP 1000

Print Speed: *6 pages per minute.*
Internal RAM: *1.5 megabytes.*
Resolution: *300×300 dots per inch. Printable area max. 8" wide, 13½" long. Printable area at 300 dpi, 8½×11" sheet.*
Paper Size: *Letter, legal, half-letter, A4, A5, B5, 4-8½" wide and 8⁵⁄₁₆×14" long. Paper tray holds 150 sheets 20# bond max.*
Duty Cycle: *3000 sheets average per month.*
Interfaces: *Video, Centronics parallel.*
Dimensions: *8⁵⁄₁₆ × 16¹⁄₁₆ × 16¹⁵⁄₃₂".*
Weight: *37.5 lbs.*
Power: *120 VAC, 60 Hz.*
Emulations: *Tandy, IBM ProPrinter, IBM WheelPrinter, HP LaserJet Plus.*

Creating computer applications in-house makes budgetary sense for a Pennsylvania PBS station.

Public Broadcasting station WITF in Harrisburg, Pennsylvania, is a prime example of how a small investment and a lot of imagination can make business more productive. In 1984, Stewart Cheifet arrived from California to assume the position as President of WITF. In just over two and a half years, Cheifet's visionary ideas about computing have changed the way the station operates. From the outside, the changes might seem unnoticeable. From the inside, the employees agree, the changes at WITF are both substantial and permanent.

"It has been a relatively modest investment in software, and it's not a lot of fancy stuff," said John Blair, WITF Senior Vice President and Station Manager. "It's Scripsit and a couple of other things that makes us able to do what we do. We've scarcely bought anything in terms of specialized programs. It's all generic word processing, office management and telecommunications."

Along with Cheifet came Mike Davidson to take on the position of Data Processing Manager. "Computing was almost nonexistent when I arrived," Davidson remembered. "They had one laptop computer that the station manager used. At the last station where I worked, I used Tandy 6000 computers. Many of the applications we use here were developed at that station. However, we have modified them to suit our particular needs."

Davidson surveyed the situation at WITF and decided the radio station

Supervising Engineer David Peters uses Tandy computers to control WITF's satellite up link.

was the area to be computerized first. "The radio station is now the biggest computer user at WITF," Davidson said. "It is running on a Tandy 6000 with five terminals. We added an additional three-user card because we needed an easy way to have other people outside of the radio station connect to the 6000 with a modem."

Scheduling solutions

Computer applications at WITF are based on generic, multiuser software packages customized by Davidson. "We have two basic programs on the Tandy 6000, Scripsit 16 and FilePro 16 Plus," Davidson said. "We use Scripsit to write press releases and to generate our program log, and FilePro for our databases." The program log details the music programming of the radio station for every block of time during the day and is used both internally and as copy for the station magazine, *Apprise*, which is distributed monthly to WITF's more than forty thousand subscribers. "To create the program log, we use a master week file with each day as a separate document," Davidson explained. "Programming that stays the same week after week is entered into the master log; areas where programming changes are left blank. We copy a master Monday, for example, and make it a specific Monday with a date, and then fill in the blanks with programming. It used to take about an hour and a half to compile and type the log, now it takes about fifteen minutes."

Of course, programming can't be entered into the log until it is scheduled. The radio station programs fifty hours of music each week. Filling that time with music, once a monumental

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Communications Coordinator Brian Clark uses a Tandy 1000 to compile WITF's monthly magazine.

task, has been simplified through the use of one of Davidson's database creations. Before the Tandy 6000, the music director would type a play list for each day of the month. The station manager would also make a list of concerts scheduled to be aired during the month that would preempt blocks of time normally programmed by the station. The lists would then be literally cut and pasted together to create a merged document for each day of the month. "It would take two or three days to cut and paste," Davidson said. "Then the sheets were taken to someone in the communications department who would retype all the information, which was a total waste of time. It was taking nearly two weeks to get the music scheduled."

Cue the computer

Davidson developed applications for both the music director and the station manager that could later be merged into one document. When the music director wants to schedule a work of music the software first asks if a compact disc or a long playing album is being scheduled. "We've put our compact disc library in one database under FilePro. The albums haven't been entered into a database yet.

There are about 30,000 of them and they're not used that much," Davidson explained. You can search by either a compact disc number, a composer, a specific work, or a holiday. All of that information was coded as it was put into the compact disc library." Once the selections are made, the computer checks to make sure a particular block hasn't been over programmed. "The selections have to end," Blair said. "Our listeners don't understand fading out for the news."

While the music director is scheduling music, the station manager, working at another terminal, enters concert information into the computer using Scripsit. "I assemble all the programming for our schedule from their input and then do an export, which sends these files to an ASCII file which I then merge with my master guide listings," Davidson said. "I end up with a master ASCII file of the entire month for radio programming and then send that to our communications department's Tandy 1000 by a modem."

Once received at the communications department, the radio program log is proofed and edited. It is then transmitted to the in-house typesetter which is hard-wired to the Tandy 1000. "We are now transferring everything electronically," Davidson said. "It has cut probably a week and a half to two weeks off of the time it takes to put the program guide together."

Going station-wide

Another phase of computerization that is underway at WITF is in the television station. Staff members can now access the Tandy 6000 in the radio station on another floor through a Tandy 1000 connected to a phone modem. "We designed a program rights database that keeps track of the programs that the television station buys. We can generate reports listing when

the station's rights start and expire and how many airings are allowed, plus keep track of when each program was aired. The television section is also changing over to do its program log the same way that radio does," Davidson said. "We're looking into getting the television station a hard-wire connection to the 6000."

The latest department to begin using computers at WITF is the business office which just acquired two Tandy 1000 SXs to handle their budget projections which were previously done with pencil and paper. "Now we're looking at adding stations that are free standing, but connected. If we could get everything connected to the business office, we could expedite a lot of
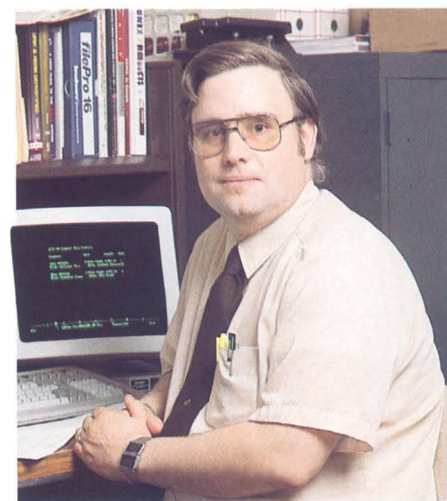
Data Processing Manager Mike Davidson created the applications that brought WITF into the computer age.

our accounting and project costing," Blair said. "These are things that everybody wants, but we haven't developed the applications yet. Given what we have been able to do with literally a very few thousand dollars, we will probably end up putting in our own system. We like the flexibility."

The Sports Network news center is an electronic switching yard for up-to-the-minute sports information.

SCORING BIG WITH SPORTS NEWS

The world of sports is a Pennsylvania company's oyster and a multiuser computer its pearl.

When an avid sports fan on the East coast wants to know the score of a college football game in progress on the West coast, what is the best way to find out? When a local television news program's sports department needs final baseball scores for its late evening broadcast, to whom do they turn? More than ten million times last year, sports fans turned to Dial Sports for score information. And for an estimated 200 information providers, including broadcasters, sports bars and casinos, The Sports Network provided sports news as quickly as it happened on the field.

These two businesses are the two halves of CommunicationsTeam, Inc., a sports information firm in Huntingdon Valley, Pennsylvania. Each year, Dial Sports provides recorded phone messages to millions of fans in cities across the United States and Canada. The Sports Network is a sports information service sold by subscription to individuals and businesses who depend on having the most up-to-date sports information available. Thanks to two Tandy 6000 computers, CommunicationsTeam is the team no one has been able to beat in the business of sports information services.

Dial Sports, the creation of Mickey Charles, a Philadelphia area sports authority and radio personality was launched when Charles won a bid with the local Bell operating company to provide telephone sports information in the area. The company grew rapidly when it won a contract from AT&T to provide a similar service on a national scale.

A better mousetrap

When the company began providing the Dial Sports services, it quickly became apparent that the syndicated sports news services being used could

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not provide the speed, versatility, or variety of information the company wanted to provide to its callers. The obvious solution was to form its own information gathering function. "Within a relatively short period of time, our own efforts at news gathering in sports were surpassing those of the existing services," said Bill Rohrer, The Sports Network's General Manager. "It was at that point that we started to think seriously about taking the information we were gathering for the phone services and sharing it with others."

The decision to package and sell the company's sports news services prompted the creation of the company's second business venture—The Sports Network.
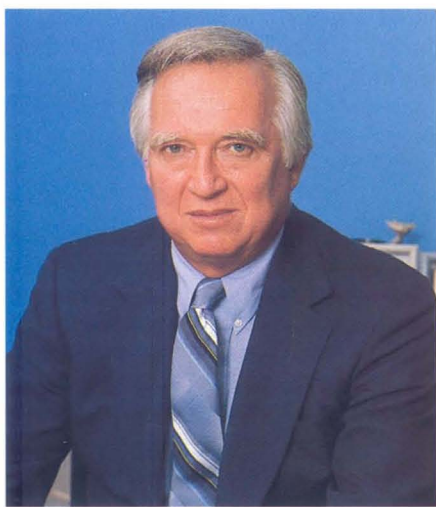
CommunicationsTeam's Mickey Charles.

As CommunicationsTeam began building its own news gathering service, management realized an immediate need for a sophisticated computer system that would allow personnel to condense the dizzying amount of scores, statistics and news that make up a typical day in the world of sports into a product that was in a format customers could easily use.

"We realized that we needed a computer to help us, and we wanted a good computer, but not one of those wonderful 'we're-going-to-attack-Mars-in-the-morning' type things," Charles laughed. "When we purchased the computers, our original intent was simply to feed our information around the country, not for the phone service but for the wire service. Once we had the computers, we started to add terminals and now we use computers everywhere. Everyone in the office has a terminal on his desk and inputs to the computer. Without the computer, we would be very lost."

"We found a consultant in our area who specialized in programming for Tandy equipment and who knew the 6000s intimately," Rohrer said. "Considering the flexibility and capacity the Tandy 6000 offered, it seemed to be the best buy in the marketplace. We had to buy two computers because we needed a fully redundant system. We cannot afford to be out of business for anything longer than minutes."

The programs that drive The Sports Network and the score tracking system are complex in design but are also easy to use. Menus guide a scoreboard operator through the process of making scoring updates and code numbers assigned to teams allow for changes to be made with minimal keystrokes. Since many sporting seasons overlap, scoreboard operators may be covering basketball, hockey and baseball on the same day. "We have covered over 200 games in a single day," Rohrer said. "The multiuser environment is obviously very important to us."

Built for speed

To CommunicationsTeam, one of the most important aspects of covering sports is delivering scoring updates quickly. "The system is designed so that it is literally possible for us to have a touchdown in the NFL transmitted over our network to our customers within ten seconds or sooner of the event occurring on the field," explained Rohrer. "Generally, for most events in sports, we say that if what happens on the field is not delivered within a minute of the action occurring, considering all the activity we encounter on a Saturday in September, something has broken down in the system. At most times, average time between the event and transmission is somewhere between thirty and forty seconds; it has to be that fast."

To get scoring updates at the speed the company and its customers demand, CommunicationsTeam uses three methods of news gathering. One method posts stringers in the press boxes at games with a direct phone line to the company's scoreboard operator. The stringer calls the operator as soon as there is a change in scoring.

In addition to stringers, the company is now utilizing four satellite dishes to follow games electronically. The dishes feed twenty-five TV sets set up in the news center. "We monitor as many games ourselves as we can, because it's quicker than using stringers," Rohrer said. "Anything that we
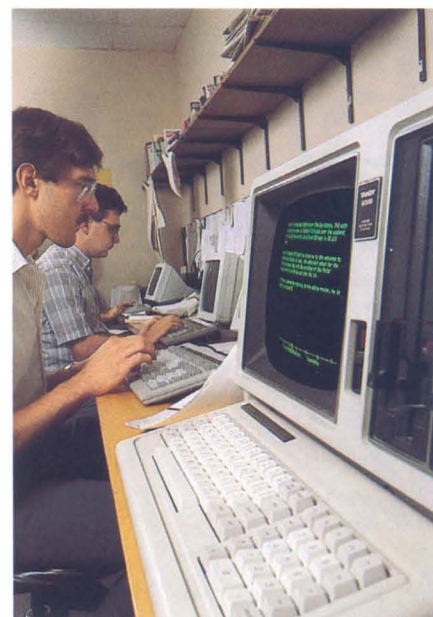
Terminals connected to the Tandy 6000 allow multiple operators to send out scoring updates.

can do to pare down seconds in the reporting of events is to our competitive advantage."

The third method is to call out by phone to the sporting event. Scoreboard operators have the courtside phone numbers for every game being played everywhere. If a game is not on television, a stringer has not been assigned, or technical difficulties make other communication impossible, scoreboard operators can call courtside periodically for scoring updates.

As the largest user of The Sports Network's services, The Dial Sports services immediately know of any news breaks or scoring changes. The service is subdivided by city, and the report is custom tailored for each city. "The service in a particular city will be updated as frequently as every five minutes or even faster depending on the flow of events," Rohrer explained. "If the person who is responsible for the service in a particular city has just given a report and an important final comes in, that operator can put that update on the phone service right away, within the same period of seconds that The Sports Network can transmit it."

In closing, Charles explained the success and rapid growth of CommunicationsTeam very simply. "We know what the public wants," he explained with a smile. "Consequently, we have set the pace. We are in more cities with sports than anyone else because we do our homework and we know the market."

Big success on a small

Computers help to make a California securities brokerage efficient

California's Silicon Valley, a small area wedged between San Francisco and San Jose, received its distinctive name because of the role the area has played in the computer industry. Not every business in the area was built around the silicon chip, however. Some enterprises have adopted computer technology as a refinement for types of businesses that existed long before the computer revolution.

One such company is Foothill Securities, Inc. of Los Altos, California. Founded in 1962, Foothill Securities, through its main office in Los Altos and sixteen branch offices in Northern California, has grown into a large independent company whose sales in 1986 exceeded $31 million.

Investment securities brokerages are nothing new to this area. However, according to Owner and President Rex Gardiner, the computer technology employed at his firm has been instrumental in bringing the company to its successful status. "We envision a very bright future," he smiled.


Perhaps what is most amazing about Foothill Securities' success is the small scale on which such a large enterprise operates. The company headquarters is a tight 352 square feet. Packed within these four walls are the firm's four employees—two full-time and two part-time—and their five computers. "Everybody says I've got to get more space," exclaimed Gardiner. "What I say is, we're going to get another computer, we're going to be more efficient and we're going to stay within this space."

Storage and beyond

Gardiner has been fascinated with microcomputers since their introduction and understandably so. The brokerage business, of necessity, carries with it veritable mounds of paperwork. In addition to essential client information, data regarding transactions, payroll and commissions, and investment product types requires meticulous record keeping.
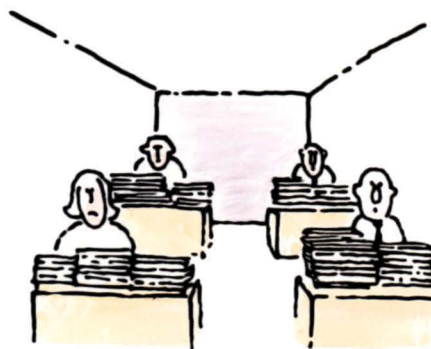
Thus, Gardiner welcomes the concept of microcomputers in his business. "At first, they said you could run a business on 4K of memory. Then they said it would take 16K, and then 32K, which turned out to be true," Gardiner said. "I was more concerned with storage. When they came out with a computer with two disk drives, I decided it was time to move. We bought a Radio Shack Model III with 32K and ran our general ledger and our database. When the Model 4 came out, we converted to it because it could do things the Model III couldn't.

"When we finally came to the point where we were going to upgrade from TRS-DOS to MS-DOS, we weren't sure what we were going to do. At that point we debated again: IBM, or Compaq, or Tandy," said Rex Gardiner's son, Steve, who has created all of the company's computer applications.

"We looked over all the options, and debated it, and decided to stick with Tandy. Good products, good service, good support, and good prices. We bought three Tandy 3000s. One has a 35-meg hard disk in it and a coprocessor and is running XENIX. The other two 3000s each have a 20-megabyte hard disk."

Multiuser databases

To keep track of business and promote productivity, Steve Gardiner has developed three databases. The transaction blotter is a database that was set up to keep track of the company's transactions in compliance with Securities and Exchange Commission regulations. When a representative makes a sale, the order is written on a four-part sales ticket, one part of which is sent to the company office.

"This ticket is the heart of our system," Gardiner explained. The sales ticket contains all the necessary information on the investment, the investor and the representative to feed the data needs of the blotter. Once the information from the sales ticket is in the database, it can be accessed using any of the inputs (ticket number, investor, etc.) as a reference point.

When a sale is made by one of the representatives, the company is automatically paid its commission by the investment underwriter. "When the commission check comes in, it is accompanied by a statement indicating the representative, the amount of the commission, and the investor," explained Steve. "We find the transaction that matches the commission being paid and then go into the database and mark the ticket paid on that date and the amount of the commission. The check is then entered and the two should balance out to zero."

scale

and profitable.

To further increase efficiency, the transaction blotter has been combined with the incoming commission checks enabling the company to run payroll on the computer. The information from the commissions are fed into a spreadsheet which calculates each

representative's commission, their manager's override commission and a variety of other calculations including a statement showing the orders for which they are being paid and any backlogged orders. "Our databases do a lot more than calculate payroll," Gardiner said.

Another part of the payroll program makes a printout for each branch manager of all orders for the week sorted by representative, plus all orders pending. The transaction database is also used to print quarterly and annual statements for each representative

listing their production sorted by customer, investment and commission amount. "These quarterly and annual statements are interesting to the representatives because they find that a high percentage of their commission comes from just a few people," Gardiner said. "We have the data coded in so many ways that we can print it out any way we want."

To keep track of the company's many product offerings, another database was developed which lists investment products approved by the company for sale by representatives. "The hardest part of our whole business, harder than keeping track of commissions or representatives, is keeping track of the investment programs that we have cleared and approved for sale," Gardiner explained. After trying several methods over the years to keep track of products, Gardiner decided to enter everything regarding any investment program into one database. From the product database, which is updated daily, a product printout is created and distributed to representatives monthly.

A third database keeps track of the company's more than 60 registered representatives. This database allows for storage and easy retrieval of pertinent employee information such as employment date, what licenses each representative holds, company code number, and personal information such as address and phone number.

Data by phone

Plans are underway to create yet another database that will be used as an electronic bulletin board and for electronic mail between the branches and the home office. In addition, the branches will be able to access the in-house databases. This will be the company's second attempt at an on-line information system.

"We started using a bulletin board system for our managers that would

allow them to call up and see our current product listings. We tied the computer into an 800 phone line," said Steve. "We couldn't get the data on line efficiently with that computer," Gardiner added. "On a network system, information has to have time value. If it's out of date it doesn't do you any good." Foothill plans to purchase another Tandy 3000 that will be dedicated to the task of operating the bulletin board system. "With the new computer, the bulletin board will be easy to maintain," Steve said.

It would be safe to say Foothill Securities is dependent on its computer system. "There's no way we could have handled the volume we do now without computers," exclaimed Gardiner. "We've had examiners tell us we have the most efficient operation they've seen. One of them asked me how much more volume we could do. I don't see any reason why we couldn't do double what we do right now without doing much more work."

"Basically, our long term goal is to be the lowest net cost producer in the industry," emphasized Gardiner. "Our computers, and our plans for them, will undoubtedly help us realize that goal."

Radio Shack and education:

When microcomputers made their debut in classrooms in the late 1970's, a hue and cry resounded throughout the educational community proclaiming that the devices were the harbingers of an Orwellian future with the education of America's youth controlled by machines instead of people. Far from this prophecy, in classrooms today, the microcomputer has been accepted as merely another learning tool, albeit a very powerful one.

In just a few short years, microcomputers have found their way into a high percentage of America's over 100,000 primary and secondary schools as well as its 3,300 colleges and universities. According to Dataquest Inc., a research firm based in San Jose, California, of public schools in 1985, an estimated 75.88 percent of primary schools, 89.93 percent of secondary schools, and 71.42 percent of colleges and universities were using personal computers. It is projected that by 1990, the penetration will be 99 percent at all levels of education. In terms of expenditures and size, the education market represents one of the nation's largest industries with a vast potential for microcomputers.

The success of microcomputers in the classroom is predicated on a number of factors, not the least of which is their popularity in the business world. Parents, teachers and administrators reason that students must be computer literate to compete for future employment. The integration of computer literacy into the curriculum lends itself to real work situations for students and increased productivity throughout the learning process.

Demands of the marketplace

The proliferation of computer usage in education, however, has proved to be something of an accomplishment. Due to unique circumstances, the educational marketplace requires special attention on the part of those who would sell their wares to schools.

Realizing these special requirements, Radio Shack established an Education Division in 1980 to address the needs of educators. Today, Radio Shack is recognized as one of the "Big Four" microcomputer manufacturers prominent in the educational community along with Apple, Commodore and IBM.

The achievement of this status for Radio Shack is a result of the company's dedication to servicing the needs of the education field in general, not just acting as a retailer of computers. To accommodate schools in their computerization efforts, Radio Shack implemented a variety of programs designed for the educational environment. In addition to forming a nationwide sales force of educational specialists and coordinators who understand the particular requirements of educational institutions, Radio Shack initiated special pricing structures and procurement arrangements for schools.

In 1981, Radio Shack began a program which offers free computer literacy training to educators to help them become familiar with computers. By 1983, over 400,000 teachers had completed this training. That same year, Tandy Corporation's President, Chairman and CEO John V. Roach was recognized by then Secretary of Education Terrel H. Bell for Radio Shack's significant contribution to computer literacy through the teacher training program.

Another important program initiated by Tandy Corporation/Radio Shack in support of the educational community is the Tandy Educational Grants Program. Established in 1983, the grants program is designed to promote research and development activities regarding microcomputers in an educational environment. Grants submissions are evaluated by an independent review board. Educational institutions selected for grants receive Tandy computer equipment. Since its inception, over 1.2 million dollars in computer equipment have been awarded to
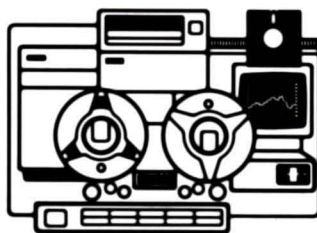
Computers and commitments

schools through the Tandy Educational Grants Program.

In 1984, in its effort to further promote educational computing, Tandy Corporation joined forces with the University of Texas at Austin College of Education to sponsor the Conference on Technology and Education. Held each spring, the conference is attended by educators at all levels and features presentations on timely topics by leaders in the educational field. Since its debut, the conference has taken on international proportions and has been joined in sponsorship by prestigious educational institutions that include the University of Edinburgh (Scotland) Department of Artificial Intelligence; the University of Tennessee Department of International Studies; the University of Southern California; and the Association for Educational Data Systems (AEDS).

Seeking software solutions

While microcomputers were initially utilized in the classroom to teach basic programming skills, they are now being used in nearly every curriculum area from reading and language skills to business classes. While a variety of software is available, schools often desire software tailored to coincide with other curricula media. In an effort to help provide this type of software, Radio Shack actively supports over 100 educational software publishing companies in their development efforts. This support is highlighted by an annual Publishers' Workshop hosted by Radio Shack where publisher representatives attend seminars, receive computer product briefings and hear presentations from Tandy Corporation/ Radio Shack management.

Technology for Teaching

Radio Shack has long been a leader in computer technology in general and specifically in the educational arena. In 1979, the company introduced the first low-cost network system designed specifically for classroom use. This system, the Network 1, and its successors, the Networks 2, 3, and 4, represent Radio Shack's dedication to the education community through constant product development and enhancement to meet the increasing computer needs of school systems. These network products have enabled schools to share information and learning resources through special software versions developed for Radio Shack's microcomputers, notably the Models I, III, 4, Color Computer and, most recently, the Tandy 1000 family.

The commitment continues

Radio Shack continues its commitment to the advancement of technology in education with a variety of innovative school-oriented computer products. One such innovation is the Trackstar 128 Apple emulation board from Diamond Computer Systems, Inc. Trackstar is designed to allow schools to run most Apple microcomputer software on the Tandy 1000 SX, in addition to DOS software developed for PC-compatibles. This gives school administrators a wider choice of software than is available using just Apples or PC-compatibles.

According to William D. Gattis, Vice President of Radio Shack's Education Division, exploring software applications will soon be the central focus of educational computing. "The hardware is the means to an end. We are very competitive with our product line. Our concern for quality software for the educational environment is reflected in our support of educational publishers and relationships with other educational vendors. It is an important focus for us."

It has been the philosophy of Tandy Corporation to meet the needs of computer users with the technology and support necessary to turn complex problems into sensible solutions. Through its commitment to education, Tandy Corporation/Radio Shack has made a commitment to the future.

25

Computer educat

Bringing a school system into the Information Age requires foresight, funding and plain old determination.

The pastoral piney woods indigenous to Gaston County, North Carolina, provide a picturesque facade for an area teeming with the activity that accompanies an upsurge in its economy and, subsequently, its population.

As public information coordinator for Gaston County Public Schools, Bonnie Reidy fields a variety of questions from families relocating to the area. Invariably, questions concerning opportunities for students and computer education arise. "It's one of the top five questions I get from families moving into this area. 'Do you offer computer education?'"

The answer is a resounding yes. In fact, Gaston County offers one of the most innovative programs in the country. Gaston County also has the distinction of being the first school district in the nation to install Radio Shack's MS-DOS version of the Network 4 Shared Learning System.

Located west of Charlotte, Gaston County is the fifth largest school district in North Carolina with approximately 32,000 students in 55 schools. Establishing a quality computer education program required tremendous support from the state, county board of education, administration, faculty and citizens of the county.

Historical sparks

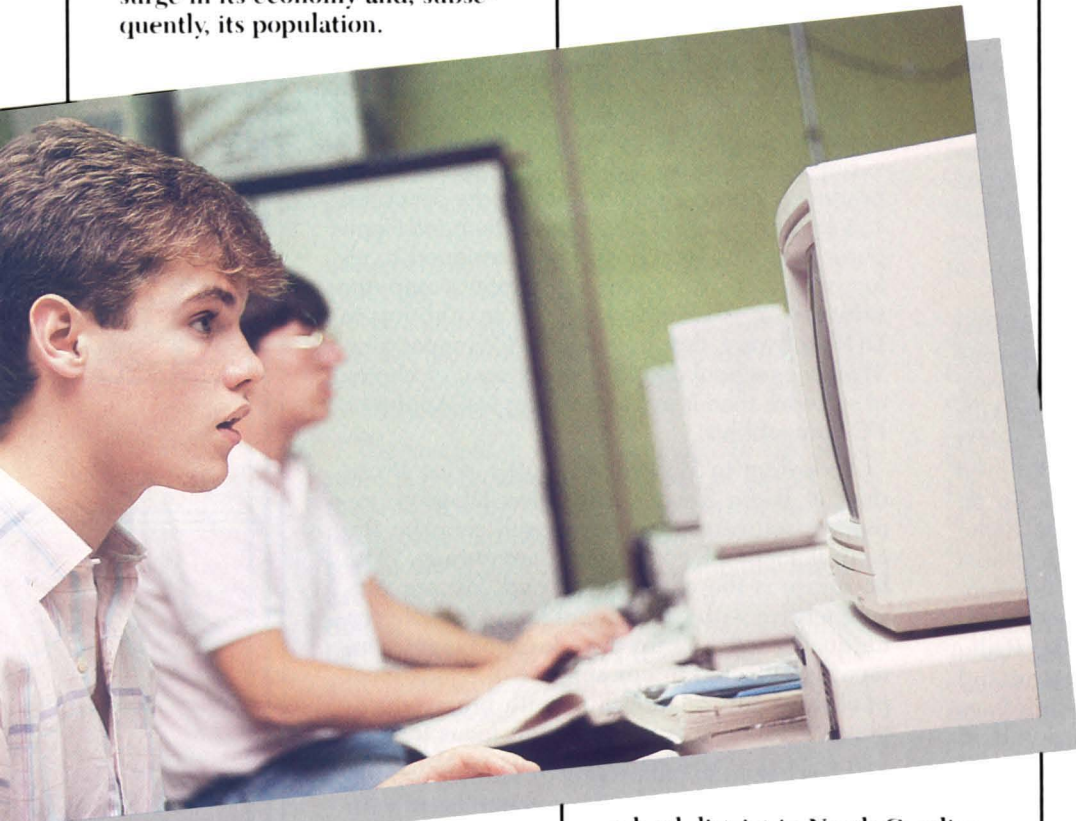One individual, in particular, is credited with generating student interest and giving the Gaston County program direction. David Shellman, a chemistry teacher and self-taught computer enthusiast, had one free class period to teach programming on a TRS-80 Model I computer. Unlike a formal class, participating students chose to stay at school instead of heading home at the end of the day. Shellman had soon sparked enough interest to have three full classes at North Gaston Senior High School. The rest, as they say, is history.

Demand for the class grew rapidly. Then in 1983, the Gaston County Board of Education accepted the challenge to implement computer education on a system-wide basis. Computer advisory and curriculum committees were formed. Shellman was subsequently promoted to computer coordinator for the school district.

Using local funding, the board of education instituted a plan to install stand-alone computers in the schools. Familiar with Radio Shack computers, Shellman recommended installing TRS-80 Model III and Model 4 personal computers in seven high schools. Some would be linked together by Radio Shack's Network 3 Shared Learning System so students could share hardware and software. Of equal importance, teachers could control instruction.

At about the same time, the state legislature allocated three years of funding to support computer education in all public schools. For Gaston County, the funds provided a ratio of one computer per 50 students in grades K-12 and approximately 30 cents per student for software.

By the end of the three-year funding, technology had changed.

ion with a cause.

Computers with the MS-DOS operating system became known as the industry standard. Shellman and the Gaston County decision-makers took notice, along with many other educators.

"We anticipated something new from Radio Shack for the Tandy 1000 and we wanted to be in an MS-DOS environment," explained Shellman. "We felt our students would have a better advantage graduating in that environment."

In fact, Radio Shack was on the verge of announcing the MS-DOS version of the Network 4 Shared Learning System.

The floating ground

The first lab was installed in February 1986 at Ashbrook Senior High School by Radio Shack personnel. All systems were "GO" except for an erratic problem that became more frustrating with each passing day. A team of Radio Shack educational representatives, technicians and county electricians worked day and night, plus weekends, to find the solution.

"It was May before we figured out what was wrong. We had

changed everything. Radio Shack backed it all," explained Shellman. "As it turned out, the problem was in our electrical wiring. The culprit was an ice machine with a floating ground wire."

The school district dropped their original computer concept in favor of installing MS-DOS Network 4 labs in the remainder of their senior high schools. By this time, state funds were almost drained. The board was asked to allocate additional local funds to support the Network 4 decision. The board and citizens of Gaston County came through once again with more than $180,000.

"We felt like this was the network we were looking for. We could have gone with a business environment network but we were looking for isolation and privacy so students couldn't copy each other's files," said Shellman.

"Obviously, we looked at other systems but they were just too expensive. I turned to Radio Shack because I had had good experiences with them."

Today, every senior high school in Gaston County has at least one Network 4 lab equipped with 20 Tandy 1000 student stations, a hard drive host computer and a printer. The Network 3 Systems and Model IIIs and 4s have been moved into the junior high schools to meet the state mandate of computer literacy by the eighth grade.

Shellman is especially pleased with the availability of software compatible with the MS-DOS Network 4 System and the control networking gives the teacher.

The curriculum, though not required, is a mixture of BASIC and PASCAL programming with a strong emphasis on applications.

"We feel in the future that this is the direction to go. Programming itself will be de-emphasized in computer-aided instruction. We really see more application programs, like using computers in mathematics and science, becoming more popular."

The use of Tandy computers in Gaston County Public Schools goes far beyond networked labs. For example, computer-aided design is being taught in high school drafting classes with the Tandy 2000 and Model 4s are incorporated in special education and speech classes.
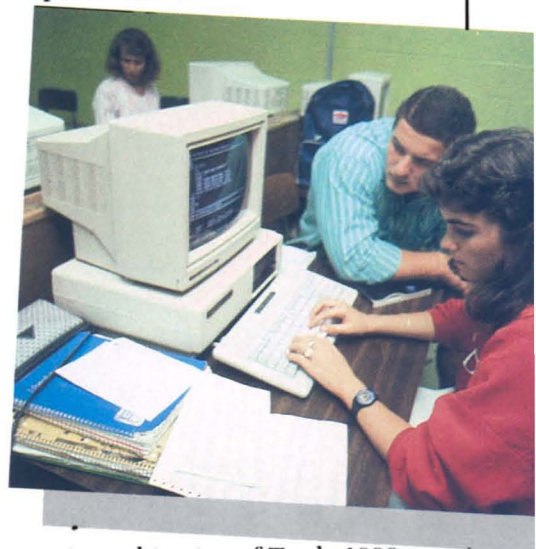
A combination of Tandy 1000s, 1200s and 3000s is being utilized in administration and in teacher training. The Gaston County Public Schools Administration Building has been equipped with a Tandy/3Com Network System.

Additionally, local school facilities are often used for adult computer education courses.

"There's no doubt our strengthened computer education program has been a strong selling point for our community's economic development," concluded Reidy.
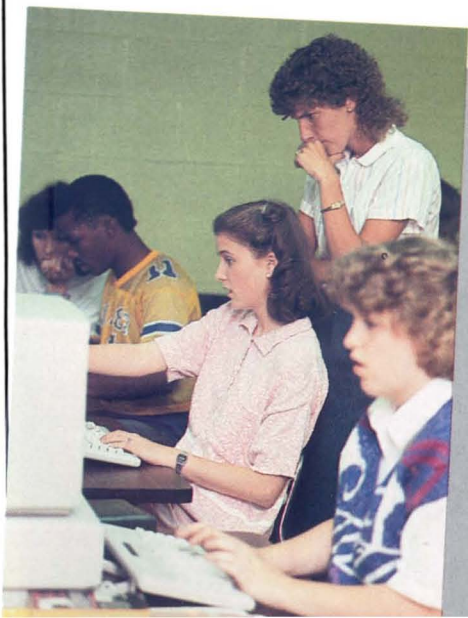
The changing library: From card files to CD-ROM

Robert Burr poses alongside the Crosby Library's namesake.

Far from replacing books, computers help a university library keep up with its bookish functions.

The library has long been the focal point for academic activity on college campuses as students and faculty alike browse the myriad shelves of books and periodicals seeking information. As microcomputers usher in the Age of Information on today's campuses, traditional library functions are being updated using current technology concepts. The Crosby Library at Gonzaga University in Spokane, Washington is no exception. Named for Bing Crosby, Gonzaga's most famous alumnus, the Crosby Library has entered the Information Age with a Tandy computer system.

As libraries must process huge amounts of data, it is obviously important for them to keep track of the vast number of books, magazines and journals in circulation. Not so obvious, but just as important, are the administrative records, financial and otherwise, that libraries must have in order to keep running smoothly.

"Libraries are information-rich operations," explained Robert Burr, the Crosby Library's Director. "In a library, you are literally surrounded by all kinds of information, and there's always the need to organize and retrieve that information. It's not only a matter of cataloging and finding books or periodicals. We also have an administrative office that has personnel records, accounting records and almost anything else you'd find in any normal business application."

Like many small businesses, the library has limited financial and personnel resources. According to Burr, the computer system has increased the efficiency of the library's operations. "We send letters to donors acknowledging the more than 5,000 books we receive as donations each year," Burr noted. "Writing that many letters on a typewriter is enough work for a full-time employee. With the computer, most of these can be handled by a form letter."

From the beginning, Tandy computers have been the computers of choice at Gonzaga's Crosby Library. Burr recalled, "Our first computer was a Radio Shack TRS-80 Model III. I was writing a few articles, and became interested in a word processor. When we saw how much easier a computer could make writing, we immediately became interested in automating more of our functions."

Now, the library has an entire fleet of Tandy computers, including a Tandy 3000 HD, two 1000 HDs, two 1200 HDs, five Model IIIs, a Model 4 and a Model 100. Serving the computers is a sophisticated array of dot-matrix and daisy-wheel printers, along with modems in various configurations.

Paper replacement

Computers have touched—in fact, revolutionized—almost every area of the Crosby Library's operations. One application that has been a boon to operations is a simple one: word processing. Virtually all text processing in the library is performed on Tandy computers using either SuperScripsit, Microsoft Word 3.0 or WordPerfect 4.1. Burr remarked, "As a result, diskettes have replaced paper as the primary medium for interoffice communication." Draft policies or reports which require staff critique and revision are routinely circulated on diskette rather than paper. "This has drastically reduced our paper files—which is important in a building like ours, where space is at a premium."

Another application that has revolutionized the library's operations is database management, using pfs:file, dBASE III Plus and Reflex software. "The periodicals/serials list is an excellent example of the new possibilities microcomputers have created for us," Burr said.

As periodicals are usually relevant to more than one field of study, the search/sort capabilities of database management programs make it easy to generate subject-specific lists on demand for library users. Additionally, management can retrieve a variety of information such as cost data for supporting particular programs, titles received from specific vendors and expenditures made against various budget lines. Historical cost analysis by title, vendor and subject area is now available in minutes, whereas before it would have required literally weeks of manual effort to produce. "We are also able to produce overdue book notices
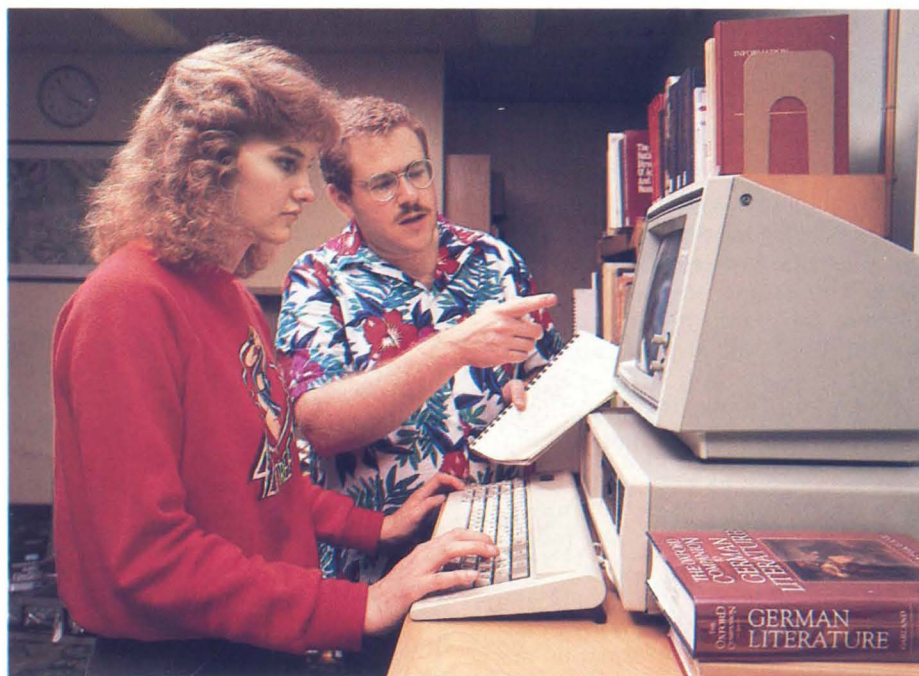
Students Melissa Muzatko and Philip Homan reference information in the database from one of the library's computers.

using database management software, and the work that would normally take days to accomplish is finished in a few hours," Burr commented.

"There are also a number of new software applications which we plan to introduce over the next one to three years," Burr continued. "One area that we are especially excited about is CD-ROM technology. Many of the on-line databases accessed by the library are becoming available on compact disk, which can be searched locally at a greatly reduced cost. The CD format is also being used by publishers as an alternative to paper and microfiles."

....database programs make it easy to generate lists on demand for library users.

Other future applications include desktop publishing, statistical analysis to better support faculty research, and project management to help plan and execute special projects with interactive variables of people and equipment. Said Burr, "We're also interested in presentation graphics, which we could use to prepare instructional materials as well as for enhanced administrative support. We're also

looking into a network system that would link all of our computers together to make our operations more efficient."

One story Mr. Burr likes to tell about the library's conversion to computers concerns his former secretary, Mrs. Ruth Seelhammer. "Mrs. Seelhammer is a very dear lady, but not one you would think of as being high-tech oriented. She had planned to retire in a couple of years, but we made the decision to go ahead and put a Model III on her desk anyway," Burr said. "The day the machine was set up and her typewriter moved to the other side of the room, she was so upset that she went home with a migraine!" But Mrs. Seelhammer soon changed her mind about using computers. "Within a couple of months, she told me she didn't know how she'd ever gotten along without it."

After retiring from her post as Administrative Secretary, Mrs. Seelhammer became the curator of a rare book collection at the Crosby library. "When she left, she took her Model III with her," Burr remarked. "She's still using it, too, and very happily."

Budgetary benefits

The library utilizes the "what if" capabilities of VisiCalc and SuperCalc 3 spreadsheet software to calculate budget proposals with automatic adjustments for projected cost increases. "The relationship among expenditure lines in the library is very complex,"

Burr explained. "Any increase in funds for book purchases requires a proportionate increase in several other categories. With spreadsheets, we are able to test alternatives quickly and easily."

The graphics capabilities of Super-Calc 3 have been useful in supporting the library's budget requests. Said Burr, "Our experience has shown that a line or bar graph showing comparative rates of book cost escalation and budget increases over a five-year period is far more persuasive in justifying a funding request than a simple recitation of the numbers."

Microcomputer telecommunications have brought about some radical changes for the Crosby Library. Most of the traditional paper indexing and abstracting tools which libraries have relied upon to locate information are

> ## "Electronic communication is the norm rather than the exception."

now accessible on-line via microcomputer. Tandy computers are used daily to search on-line databases in response to user requests, effectively providing an entirely new library service.

Administrative use of telecommunications has also been significant. According to Burr, Tandy computers have yielded important savings of staff time on a variety of projects requiring data input to the university mainframe computer or other mainframes. The majority of new book orders are now placed with publishers and distributors by electronic mail, with increased speed, lower overall cost, and greater reliability.

"Electronic communication with other libraries, especially the sending and receipt of interlibrary loan requests, is now the norm rather than the exception," said Burr. "I also rely on electronic mail to keep in touch with the office during business travel and, quite frequently, to send work done at home back to the office on evenings or weekends."

Future functions

"We have achieved tremendous gains in productivity," Burr said. "But we're not stopping yet. There are still many library functions which continue to be performed manually that we could automate in the future."

Computers bring the library to a Canadian reservation
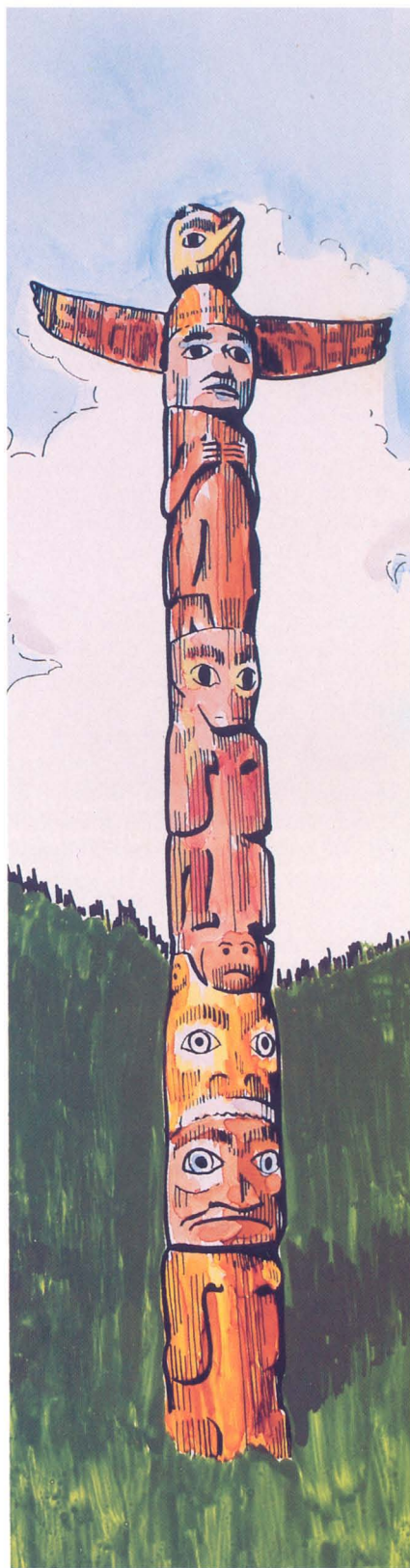
Computers are opening new frontiers for Gonzaga University and a group of Native American Indian students isolated in the mountains of Canada. The school, in conjunction with the Canim Lake Indian Band, has begun an Extension Undergraduate Degree Program that serves the Indians' reservation almost 700 miles away in the province of British Columbia.

Students in the program are able to work for a bachelor's degree in Native American Leadership. The primary areas of study are education and business management—areas that the Indians feel will help them improve from within.

What's unique about this first-of-its-kind program is that the students are able to complete the degree program while staying at their reserve—they only have to travel to the university for six weeks each summer. Acknowledged Burr, "The band members prefer to remain on the reserve and contribute within their own culture. Also, the mountainous terrain and hard winters in the Pacific Northwest can make travel almost impossible. With computers, we have been able to overcome those barriers."

Using a Tandy 3000 computer with an external CD-ROM drive, students are able to access the Crosby Library's entire catalog. The students request study materials from the catalog via electronic mail, and the library sends the materials either by mail or via facsimile equipment. Students also use the computer as a word processor, and send assignments to the library for their instructors to review.

The Extension Undergraduate Degree Program may be a model for similar programs in the future. Said Burr, "The Canadian government and the reserve are extremely interested in the program's potential. It is a highly innovative program, and we are excited about its prospects for success."

COMPUTER-AIDED MARCHING BAND

Tradition dictates that during college football games, halftime is the domain of the marching band. Whether the band is spelling out the school name or interlocking two rotating circles, hours have been spent in detailed planning to create the band formation. How many hours are spent creating formations depends on the method used. Directors of the University of Florida Gator Band in Gainesville, Florida, have found that by using a Tandy 1000 computer to design marching formations, the once laborious task is simplified and the time required reduced.

The execution of a formation is broken down into intervals, steps that each member must make individually in order for the band as a whole to "fall into formation" at the exact same moment. At each interval, determined by counts in the music, a band member must progress from one designated position on the field to the next. Since the creation of a formation might take as many as eight intervals to complete, and a half time show might consist of as many as eight formations, it's easy to understand why a band director would appreciate a short cut to making charts for up to sixty-four intervals.

Bruce Ammann, assistant director for the Gator Band, creates and maps out formations on a Tandy 1000 using Music Education Incentives software. "The computer speeds up the process of creating formations," Ammann reported. "If I do a formation by hand, I sketch a design, then I take that design and put down dots for each band member. In order for a formation to work, those dots have to be in the right spot, at exactly the right interval."

When Ammann creates formations on the computer, he has room, and time, for experimentation. "The computer creates a design; if I like it, the computer puts the design exactly where I want it on the field." Once a design has been selected, Ammann can then begin assigning band members to the design. When the design is filled, Ammann begins the process again by adding a complementary design into the larger formation until all band members are on the field. Once all of the smaller designs are incorporated into the larger

formation, an animation phase can be initiated for an on-screen simulation of how the formation will look in execution.

When satisfied with the way a formation works, Ammann prints a set of charts that are used as a guide for band members. The finished product looks like a football field with dots indicating the position of band members. Each dot pin-points a band member's position on the field at a specific interval of a formation. "If I have three intervals in a formation," explained Ammann, "one interval is the beginning, one is eight counts later, and the other is eight counts after that. The band members go out on the field and stand where their dot is on the first chart, then they turn to the second chart and move to their dot on that chart."

The program itself contains more than a hundred designs that can be used to create formations. To further expand the system's utility, Ammann purchased a Tandy GT-2000 Graphics Tablet that allows him to supplement the designs standard with the software. "The device allows us to take a marching chart from another marching band or a design that I draw on a piece of paper and digitize the formation into the computer," Ammann explained. "I'm not limited to just the shapes included in the program."

Before purchasing their Tandy 1000, the Gator Band already owned a Radio Shack Model 4 computer which they used for bookkeeping, storing alumni and band member addresses and maintaining an inventory of the music library and band uniforms. "The software vendor for the marching band program recommended the Tandy 1000 as the computer on which their software ran best," Ammann said. "After our good experience with the Model 4, we were happy to stay with Tandy computers."

Since computerizing, Ammann has found that the band's formation possibilities may not have increased considerably; he can draw any design by hand the computer can generate. What is important from his point of view is the time he saves. Since creating formations is only one of Ammann's duties, finding a method that allows the task to be completed as satisfactorily as before—while saving time—is a welcome relief.

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Our MS-DOS® based computers are the best-selling PC compatibles in America. Tandy 286- and 386-based business systems are OS/2™ ready as well.

Technology.

Innovative design, custom circuitry and distinguishing features make our computers more than just clones. Plus, every Tandy desktop computer is designed and built in our own USA manufacturing plants.

Connectivity.

Tandy PC compatibles can be linked into a workgroup for communications with other PCs and mainframe computers alike.

Longevity.

Technology has been our business for sixty-six years. In 1977, we became the first company to successfully manufacture and market a personal computer—nobody's been in the business longer.

Tandy Computers: Because there is no better value.